

## CLAIMS

What is claimed is:

5      1. An automatic test system for testing electronics, the automatic test system comprising:

a module to be used in connection with testing the electronics;

a module holder; and

a control subsystem including:

a first element attached to the module, the first element having one of an identifier and a sensor,

a second element attached to the module holder, the second element having the other of the identifier and the sensor, wherein the sensor is configured to (i) read the identifier when the module begins insertion into the module holder and (ii) provide a sensor signal in response to reading the identifier, the sensor signal having a value indicative of the identifier, and

a controller which couples to the sensor, the controller being configured to receive the sensor signal from the sensor and output a control signal based on the sensor signal, the control signal indicating whether the module is authorized to substantially insert into the module holder.

20      2. The automatic test system of claim 1 wherein the module holder includes a card cage having a first support member defining a first set of rails and a second support member defining a second set of rails; wherein the first and second sets of

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rails form a universal card cage slot which is sized to receive differently designed modules configured to perform different functions; and wherein the second element fastens to one of the first and second support members at a location which is adjacent the universal card cage slot and proximate to a front opening of the

5 card cage.

3. The automatic test system of claim 2 wherein the module includes:

a circuit board having a leading edge, a back edge opposite the leading edge, and side edges; and

10 circuit board connectors disposed along the leading edge of the circuit board, wherein the circuit board connectors are configured to connect with backplane connectors when the side edges of the circuit board engage with the first and second sets of rails forming the universal card cage slot and when the module substantially inserts into the card cage along the universal card cage slot, and wherein the first element fastens to a location on the circuit board adjacent 15 both the front edge and one of the side edges.

4. The automatic test system of claim 1 wherein the module holder includes a card cage, and wherein the controller includes:

20 a computerized circuitry having memory which stores an authorization database of entries, and processing circuitry which determines whether the module is authorized to substantially insert into the card cage along a universal card cage slot based on a comparison of the identifier with the entries of the authorization database; wherein the memory of the computer further stores a variety of test programs for testing the electronics using the module; and wherein the processing circuitry is configured to control testing of the electronics by managing use of the 25 test programs.

5. The automatic test system of claim 1 wherein the module holder includes a card cage having multiple universal card cage slots which are configured to receive the module; and wherein the control subsystem has multiple sensors, including the sensor, which are coupled to the controller to control insertion of the module into  
the card cage along each of the multiple universal card cage slots.

6. A control system for indicating whether a module should be inserted into a module holder, the control system comprising:  
a sensor which is configured to attach to one of a module and the module holder, the sensor being further configured to (i) read an identifier of an element attached to the other of the module and the module holder when the module begins insertion into the module holder and (ii) provide a sensor signal in response to reading the identifier, the sensor signal denoting the identifier; and  
a controller which couples to the sensor, the controller being configured to receive the sensor signal from the sensor and output a control signal based on the sensor signal, the control signal indicating whether the module is authorized to substantially insert into the module holder.

7. The control system of claim 6 wherein the module holder includes a card cage having a first support member defining a first set of rails and a second support member defining a second set of rails; wherein the first and second sets of rails form a universal card cage slot which is sized to receive differently designed modules configured to perform different functions; and wherein the sensor is configured to fasten to one of the first and second support members at a location which is adjacent the universal card cage slot and proximate to a front opening of the card cage.

8. The control system of claim 7, further comprising:  
the element and the module, wherein the module includes:  
a circuit board having a leading edge, a back edge  
opposite the leading edge, and side edges; and  
5 circuit board connectors disposed along the leading  
edge of the circuit board, wherein the circuit board  
connectors are configured to connect with backplane  
connectors when the side edges of the circuit board engage  
with the first and second sets of rails forming the universal  
card cage slot and when the module substantially inserts  
10 into the card cage along the universal card cage slot, and  
wherein the element fastens to a location on the circuit  
board adjacent both the front edge and one of the side  
edges.

15 9. The control system of claim 6 wherein the sensor is configured to provide the  
sensor signal with a value indicative of the identifier of the element in response to  
movement of the element in a vicinity of the sensor.

20 10. The control system of claim 9 wherein the element defines, as the identifier, a  
pattern; and wherein the sensor includes a pattern reader which is configured to  
read the pattern defined by the element.

25 11. The control system of claim 9 wherein the element includes a radio frequency tag  
which is configured to provide, as the identifier, a radio frequency signature; and  
wherein the sensor includes a receiver which is configured to receive the radio  
frequency signature from the radio frequency tag.

12. The control system of claim 9 wherein the element includes a magnetic strip which magnetically stores the identifier, and wherein the sensor includes a head which is configured to read the identifier from the magnetic strip.

5      13. The control system of claim 6 wherein the module holder includes a card cage, and wherein the control system further comprises:

an output device coupled to the controller, the output device being configured to receive the control signal from the controller and output a warning when the control signal indicates that the module is not authorized to substantially insert into the card cage along a card cage slot.

10     14. The control system of claim 6 wherein the module holder includes a card cage, and wherein the control system further comprises:

an actuator coupled to the controller and disposed adjacent an opening of the card cage, the actuator being configured to (i) receive the control signal from the controller and (ii) move to one of:

a first position to allow substantial insertion of the module into the card cage along a card cage slot when the control signal indicates that the module is authorized to substantially insert into the card cage along the card cage slot, and

a second position to inhibit substantial insertion of the module into the card cage along the card cage slot when the control signal indicates that the module is not authorized to substantially insert into the card cage along the card cage slot.

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15. The control system of claim 6 wherein the controller includes:
  - an authorization database of entries; and
  - compare circuitry configured to determine whether the module is authorized to substantially insert into the module holder based on a comparison of the identifier with the entries of the authorization database.
16. The control system of claim 6 wherein the controller includes:
  - a configuration database; and
  - display circuitry configured to store configuration data and retrieve configuration data from the configuration database, the configuration data indicating whether module currently is substantially inserted into the module holder.
17. The control system of claim 6, further comprising:
  - a control system power source coupled to the sensor and the controller, the control system power source being configured to provide power to the sensor and the controller regardless of whether the module receives power through the module holder.
- 20 18. A method for authorizing insertion of a module into a card cage along a card cage slot, the method comprising:
  - attaching a circuit board element to the module, the circuit board element having an identifier;
  - beginning insertion of the module into the card cage along the card cage slot to trigger generation of a control signal indicating whether the module is authorized to substantially insert into the card cage along the card cage slot; and
  - 25 moving the module (i) further into the card cage along the card cage slot when the control signal indicates that the module is authorized to substantially

insert into the card cage along the card cage slot, and (ii) out of the card cage when the control signal indicates that the module is not authorized to substantially insert into the card cage along the card cage slot.

5     19. The method of claim 18 wherein an output device receives the control signal and outputs a warning when the control signal indicates that the module is not authorized to substantially insert into the card cage along the card cage slot, and wherein the method further comprises:

10                 manually pushing the module further into the card cage along the card cage slot in absence of the warning; and  
                       manually removing the module from the card cage in response to receipt of the warning.

20. The method of claim 18, further comprising:

15                 storing configuration data into a configuration database, the configuration data indicating whether module currently is substantially inserted into the card cage along the card cage slot; and  
                       retrieving the configuration data from the configuration database for display on a display monitor.

20     21. A method for configuring an automatic test system to authorize insertion of a module into a module holder of the automatic test system, the method comprising:  
                       attaching a sensor to one of a module and a module holder, the sensor being configured to (i) read an identifier of an element attached to the other of the module and the module holder when the module begins insertion into the module holder and (ii) provide a sensor signal in response to reading the identifier, the sensor signal denoting the identifier; and  
                       coupling a controller to the sensor, the controller being configured to

receive the sensor signal from the sensor and output a control signal based on the sensor signal, the control signal indicating whether the module is authorized to substantially insert into the module holder.